

U.S. Patent Application Serial No. 10/552,031
Response filed August 6, 2009
Reply to OA dated April 10, 2009

REMARKS

Claims 1-14 are pending in this application. No amendment is made in this Response. It is believed that this Amendment is fully responsive to the Office Action dated April 10, 2009.

Claims 1-7 and 14 are rejected under 35 U.S.C. §103(a) as being unpatentable over Takahashi et al. (JP 04066172) in view of Takahashi et al. (US 3,883,453, herein referred to as '453). (Office action p. 3)

The rejection of claims 1-7 and 14 is respectfully traversed, and reconsideration is requested.

(i) The present invention

Present claim 1 reads as follows:

Claim 1 (Original): A thermosetting liquid coating composition for an aluminum wheel comprising:

(A) a hydroxy- and carboxy-containing acrylic resin having a hydroxyl value of 90 to 150 mg KOH/g and an acid value of 1 to 30 mg KOH/g, the acrylic resin being obtained by copolymerizing a monomer mixture comprising 10 to 50 wt.% of a C₆₋₁₈ alkyl ester of (meth)acrylic acid, 8 to 40 wt.% of a secondary hydroxy-containing unsaturated monomer, and a carboxy-containing unsaturated monomer; and

(B) an amino resin.

Claims 2-7 and 14 are all ultimately dependent from claim 1.

Here, the term "**secondary hydroxy**" in the phrase "secondary hydroxy-containing unsaturated monomer" means a **hydroxy bonded to a carbon atom that is bonded to two alkyls**. It does not mean

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a hydroxy at the 2-position of an alkyl. For example, the hydroxy in 2-hydroxyethyl acrylate is a hydrogen atom that is bonded to a carbon atom bonded to **one** alkyl. The hydroxy in 2-hydroxyethyl acrylate is not a secondary hydroxy but a **primary** hydroxy.

The thermosetting liquid coating composition for an aluminum wheel of the present invention achieves distinguishing effects, such as obtaining excellent appearance, by using a **C₆₋₁₈** alkyl ester of (meth)acrylic acid, a **secondary hydroxy**-containing unsaturated monomer and a carboxy-containing unsaturated monomer as the materials for a hydroxy- and carboxy-containing acrylic resin.

(ii) Arguments against the motivation to combine US '453 with JP '172

The Examiner asserts that a skilled artisan would have been motivated to combine the teachings of US '453 with those of JP '172, because "both teachings are drawn to coating compositions that do not contain a large amount of volatile organic solvents and have higher solids content" (page 4 of the Office action).

However, Applicant submits that neither US '453 nor JP '172 provides any motivation to lead a person having ordinary skill in the art to combine their teachings.

JP '172 discloses on page 2, upper left column, lines 5-7 (page 3, lines 18 to 23 of English translation), that "an organic solvent-type coating material...contains a large amount of organic solvents, which is not preferable from the standpoint of environmental hygiene or fire resistance." JP '172 discloses that, in order to solve the above problem, the aqueous coating composition of the reference was developed.

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Specifically, the object of JP '172 is not to reduce the amount of organic solvent, but to develop an aqueous coating composition **substantially free from organic solvent** and having specific characteristics.

In contrast, the object of US '453 is to attain a high content of the acrylic resins graft polymerized in cellulose acetate butyrate (CAB) **in an organic solvent**. Therefore, the object of US '453 is totally different from that of JP '172. As Applicant has stated on page 9 of the Amendment filed on January 7, 2009, the graft polymer is barely soluble in an organic solvent, and more significantly, cannot be dissolved or dispersed in an aqueous medium.

Accordingly, the monomers disclosed in US '453 are those desirable for allowing the high content of the acrylic resins graft polymerized in CAB **in an organic solvent**. Therefore, persons having ordinary skill in the art **would not be motivated** use these monomers in the **aqueous coating composition** of JP '172.

(iii) Effects of the Present Invention

The thermosetting liquid coating composition for an aluminum wheel of the present invention achieves unexpected effects, such as obtaining excellent appearance, by using a mixture containing a **specific amount of C₆₋₁₈ alkyl ester of (meth)acrylic acid** and a **specific amount of secondary hydroxy-containing unsaturated monomer** as the materials for a hydroxy- and carboxy-containing acrylic resin.

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Table 5 in the present specification shows that remarkably improved appearance was obtained when a mixture containing a C₆₋₁₈ alkyl ester of (meth)acrylic acid and a **secondary hydroxy**-containing unsaturated monomer with specific amounts was used (see Example 10 (Production Example 1 in Table 1)).

Table 5 in the present specification also shows that Comparative Example 22 (Production Example 4 in Table 1), wherein the content of the C₆₋₁₈ alkyl ester of (meth)acrylic acid is less than that of the present invention, and Comparative Example 24 (Production Example 6 in Table 1), wherein the content of the secondary hydroxy-containing unsaturated monomer is less than that of the present invention, resulted in remarkably inferior appearance.

As is clear from Table 1, the coating composition of Production Example 6 exhibited inferior appearance, regardless of the content of the primary hydroxy-containing unsaturated monomer, associated with the insufficient content of the secondary hydroxy-containing unsaturated monomer.

Neither JP '172 nor US '453 discloses the combination of the C₆₋₁₈ alkyl ester of (meth)acrylic acid with the **secondary hydroxy**-containing unsaturated monomer. Furthermore, JP '172 and US '453 nowhere suggest that such combination achieves preferable effects. As discussed above, the effects are commensurate in scope with the present claims.

Accordingly, persons having ordinary skill in the art would not conceive the present invention, requiring the combination of a C₆₋₁₈ alkyl ester of (meth) acrylic acid with a **secondary hydroxy**-containing unsaturated monomer, from the disclosures of these cited documents. Furthermore, the above-described

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effect of the present invention, achieved by combining a C₆₋₁₈ alkyl ester of (meth)acrylic acid with a **secondary** hydroxy-containing unsaturated monomer, is clearly unexpected based on the teachings of the cited documents.

(iv) Regarding CAB in US '453

US '453 requires CAB (cellulose acetate butyrate) as an essential component. By contrast, as can be seen in the Examples discussed above, the present invention can achieve its unexpected effects without any CAB. This further argues that the effects of the present invention are unexpected over US '453.

(iv) Further Regarding the rejection of claim 14

Claim 14 depends from claim 1, and the above arguments are applicable to claim 14. Further regarding claim 14, the Examiner stated that:

"Takahashi [JP '172] does not teach the specific acid value range of the resin required by claim 14.

It would have been obvious to a person ordinarily skilled in the art at the time of the invention to modify Takahashi in view of '453 to include the 1-16 mg KOH/g acid number, as required by claim 14. One would have been motivated to make this modification because the acid number of the resin is considered a cause effective variable that can fall within a wide range of values" (page 5, line 4, of the Office Action)."

However, Applicant submits that not only does JP '172 not teach the acid value range of claim 14, JP '172, in fact, **teaches away** from selecting an acid value of 1-16 mg KOH/g. Specifically, JP '172 discloses on page 3, lower right column, lines 8-11 (page 9, lines 1-4 of English translation), that:

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"it is not preferable that the acid number be less than about 20 ... because while mixing the colloid-like silica constituent, it aggregates and gels, and it is difficult to obtain a stable water-based coating material".

This is a specific teaching against an acid value of less than 20 mg KOH/g, a lower limit well above the range in claim 14. Therefore, a person with an ordinary skill in the art would not modify the composition of JP '172 to have an acid value of 1-16 mg KOH/g.

Claims 8-13 are rejected under 35 U.S.C. §103(a) as being unpatentable over Takahashi (JP '172) in view of '453 further in view of Hirata et al. (US 5,252,399). (Office action p. 5)

The Examiner cites JP '172 and US '453 as in the above rejection, and cites Hirata for disclosing a weather-resistant coating for aluminum wheels consisting of a primer layer of a powder coating composition, a base coat layer, a topcoat composition and a clear acrylic barrier layer. The Examiner states that it would have been obvious to modify JP '172 in view of US '453 with the four layer coating composition taught by Hirata, "because all of the references are drawn to lowering the amount of organic solvents used in the coating ..."

The rejection is respectfully traversed. Claims 8-13 are methods for coating an aluminum wheel, and claims 8-13 recite steps requiring the coating compositions of claims 5, 6, 1, 5, 6 and 1, respectively. Applicant has argued above that the compositions of claims 1-6 are not obvious over the combination of JP '172 and US '453 and that there is no motivation in either reference or the prior art to modify the references to produce the present invention. Applicant submits that the Hirata reference does not provide

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any further motivation to modify JP '172 and US '453, and therefore claims 8-13 are not obvious over JP '172, US '453 and Hirata, taken separately or in combination.

If, for any reason, it is felt that this application is not now in condition for allowance, the Examiner is requested to contact the applicants' undersigned agent at the telephone number indicated below to arrange for an interview to expedite the disposition of this case.

In the event that this paper is not timely filed, the applicants respectfully petition for an appropriate extension of time. Please charge any fees for such an extension of time and any other fees which may be due with respect to this paper, to Deposit Account No. 01-2340.

Respectfully submitted,

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Enclosure: Petition for Extension